

WHAT IS CLAIMED IS:

1. An accelerator device comprising:
 - a housing having a bearing portion;
 - an accelerator pedal having a cam with a cam shaft that is supported by the bearing portion to be turned forward and reversely by an action of a treading force;
 - a follower that abuts against a cam surface of the cam when a turning position of the accelerator pedal is in a kickdown region;
 - a bias device that generates a biasing force to press the follower against the cam surface; and
 - a turning position sensor that detects a turning position of the accelerator pedal,
 - wherein the bias device is disposed such that the biasing force acts on the follower substantially toward a center of the cam shaft.
2. The accelerator device according to claim 1, wherein an angle between a vector representative of a first force and a vector representative of a second force is an acute angle, when the first force is defined by a force applied from the follower to the cam while the turning position of the accelerator pedal is in the kickdown region, and when the second force is defined by a force that acts on the accelerator pedal while the turning position of the accelerator pedal is in the kickdown region and is a resultant force of forces except the first force.

3. The accelerator device according to claim 1, wherein the cam shaft and the bearing portion are provided to have therebetween a clearance that allows a radial displacement of the cam shaft.

4. The accelerator device according to claim 1, wherein: the cam surface has a cam mountain portion to define a mountain-shaped profile curve in an axis-transverse cross section that is perpendicular to the cam shaft; and

when the accelerator pedal turns in a normal rotation direction as the treading force increases, the cam mountain portion abuts against the follower from rearward in the normal rotation direction to push the follower against the biasing force and thereafter separates from the follower.

5. The accelerator device according to claim 4, further comprising a guide member that abuts against the follower from forward in the normal rotation direction to guide the follower in a predetermined direction, wherein:

in the axis-transverse cross section, a tangent at a point, in which the cam mountain portion and the follower abut against each other, and a tangent at a point, in which the guide member and the follower abut against each other, intersect each other, and the biasing force acts on the follower toward the point of intersection.

6. The accelerator device according to claim 5, wherein the follower having an outer peripheral surface that is circular in cross section brings the cam mountain portion and the guide member into sliding contact with the outer peripheral surface of the follower while rotating about a center of the outer peripheral surface of the follower.

7. The accelerator device according to claim 1, wherein the bias device includes a holder that holds the follower and reciprocates together with the follower, and a bias member that engages with the holder to generate the biasing force in accordance with a movement position of the holder.

8. The accelerator device according to claim 1, wherein the bias device includes a bias member that engages with the follower to generate the biasing force in accordance with a movement position of the follower.

9. The accelerator device according to claim 8, wherein:
the housing has a support member defining the bearing portion; and

the bias member is a spring that has two end portions supported by the support member, and an intermediate portion between the two end portions, engaged with the follower.

10. The accelerator device according to claim 8,
wherein:

the housing has a support member defining the bearing portion;

the bias member is a spring that has two end portions overlapped with each other to have an overlapped portion, and an intermediate portion between the two end portions; and

the spring is supported by the support member at the intermediate portion, and is engaged with the follower at the overlapped portion.

11. The accelerator device according to claim 8, wherein:

the housing has a support member defining the bearing portion;

the bias member is a spring that has two end portions and an intermediate portion between the two end portions; and

the spring is supported at the intermediate portion by the support member, and engages with the follower to interpose the follower between the two end portions opposite to each other.

12. The accelerator device according to claim 2, further comprising

an elastic member and a pedal stopper, wherein:

the accelerator pedal includes a tread portion on which the biasing force in the normal rotation direction acts, an engagement portion that engages with the elastic member to be acted by an elastic reaction force from the elastic member in

a reverse rotation direction, and a latch portion that is latched on the pedal stopper to be acted by a resistance that is directed in the normal rotation direction and opposed the elastic reaction force, from the pedal stopper;

the tread portion, the latch portion, the cam shaft, and the engagement portion are aligned in this order from one end of the accelerator pedal to the other end;

the second force is a resultant force of the treading force and the elastic reaction force when the treading force acts on the tread portion to turn the accelerator pedal; and

the second force is a resultant force of the elastic reaction force and the resistance when the treading force on the tread portion is released to have the latch portion latched on the pedal stopper to stop turning of the accelerator pedal.

13. The accelerator device according to claim 1, wherein the turning position sensor is disposed to detect a turning position of the cam shaft of the accelerator pedal.

14. An accelerator device comprising:

a housing having a bearing portion;

an accelerator pedal having a cam with a cam shaft that is supported by the bearing portion to be turned forward and reversely by an action of a treading force;

a follower that abuts against a cam surface of the cam when a turning position of the accelerator pedal is in a

kickdown region;

a bias device that generates a biasing force to press the follower against the cam surface; and

a turning position sensor that detects a turning position of the accelerator pedal,

wherein an angle between a vector representative of a first force and a vector representative of a second force is an acute angle, when the first force is defined by a force applied from the follower to the cam while the turning position of the accelerator pedal is in the kickdown region, and when the second force is defined by a force that acts on the accelerator pedal while the turning position of the accelerator pedal is in the kickdown region and is a resultant force of forces except the first force.